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09/639,684	08/15/2000	Dennis H. Runnoe	14374.14	4147

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EXAMINER

THOMAS, COURTNEY D

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 07/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/639,684

Applicant(s)

RUNNOE, DENNIS H.

Examiner

Courtney Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 March 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 23-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22, 28 and 29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-9, 11-18, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeCou, Jr. et al. (U.S. Patent 5,264,801) in view of Miriam (U.S. Patent 3,558,967).

3. DeCou, Jr. et al. disclose an x-ray device, comprising: (a) a vacuum enclosure (Fig. 1, #10; column 2 lines 58-59), (b) an integral cathode disposed in said vacuum enclosure (note: column 1, lines 14-15 and 17-19, column 2, lines 45-47) said integral cathode including an emitter (Fig. 1, #12, column 2, lines 59-60) capable of discharging electrons; (c) a power source (not shown - however, examiner notes that the disclosed device could not operate without a power supply. Additionally, Fig. 1, illustrates the emission of electrons upon the application of DC potential; see also column 2, lines 61-65) connected to said emitter so that transmission of power from said power source to said emitter causes said emitter to discharge electrons (column 2, lines 61-65); and (d) a target anode disposed in said vacuum enclosure and having a target surface positioned to receive at least some of the electrons discharged by said emitter (Fig. 1, #14).

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4. As per claim 1, DeCou Jr. et al. do not explicitly disclose an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge to a focal spot.

5. Miriam discloses an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot (see Figs. 1,3). Miriam teaches that the shape of the emitter enables electrons emitted from respective portions of the emitting surface to converge to a focal spot while maintaining uniform electron emission.

6. One would have been motivated to make a modification of shaping beam emissions to focus to a particular area, for the purpose of minimizing energetic loss due to erratic electron propagation and to utilize the full power of thermionic emissions, as taught by Miriam.

7. As per claim 2, DeCou, Jr. et al. as modified, disclose an x-ray device wherein said focal spot is located proximate to said target surface of said target anode (i.e. Fig. 1).

8. As per claim 3, DeCou, Jr. et al. as modified, disclose an x-ray device further comprising a support cartridge, said support cartridge receiving said emitter and maintaining said emitter in a desired configuration (i.e. Fig. 1).

9. DeCou, Jr. et al. disclose in an x-ray tube comprising a vacuum enclosure having disposed therein a target anode with a target surface, an integral cathode disposed in the vacuum enclosure and being spaced apart from the target surface of the target anode, the integral cathode comprising: a support cartridge, said support cartridge providing structural support for said emitter (see Fig. 1). DeCou Jr. et al. also disclose a focal spot proximate to the target surface of the target anode.

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10. As per claim 5, 28 and 29, DeCou Jr. et al. do not explicitly disclose an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons be directed at the target of the target anode and converge to a focal spot.

11. Miriam discloses an emitter having a predetermined geometrical configuration oriented to cause at least some of the discharged electrons to converge at a focal spot (see Figs. 1,3). Miriam teaches that the shape of the emitter enables electrons emitted from respective portions of the emitting surface to converge to a focal spot while maintaining uniform electron emission.

12. One would have been motivated to make a modification of shaping beam emissions to focus to a particular area, for the purpose of minimizing energetic loss due to erratic electron propagation and to utilize the full power of thermionic emissions, as taught by Miriam.

13. As per claims 7-9, and 11-19, DeCou, Jr. et al. as modified, disclose an support cartridge receiving an emitter comprising a substantially arc shape (see Miriam Fig. 3), a plurality of emitting portions (Miriam Fig. 1) and made of a refractory material (Miriam column 2, line 55).

14. Claims 4 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeCou, Jr. et al. (U.S. Patent 5,264,801), Miriam (U.S. Patent 3,558,967) in view of Knudsen et al. (U.S. Patent 5,515,413).

15. As per claims 4 and 19-22, DeCou, Jr. et al do not explicitly disclose a support cartridge (that) facilitates substantial electrical isolation of said integral cathode. It would have been obvious to a practitioner in the art to provide a support for an integral cathode wherein the support (cartridge) was substantially electrically non conductive. One would have been motivated to make such a modification for the purpose of preventing electrical shorting of the device during operation through inadvertent contact with nearby conductive elements.

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Additionally, the selection of suitable/ superior insulating materials (i.e. ceramics (alumina, zirconia, etc.) glass, etc. for use in an elevated temperature environment) is a well-known practice/ technique in the x-ray tube art (see also Knudsen et al. U.S. Patent 5,515,413).

16. Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over DeCou, Jr. et al. (U.S. Patent 5,264,801).

17. As per claim 10, DeCou, Jr. et al do not explicitly disclose an emitter composed of a combination of tungsten and rhenium. One would have been motivated to make such a modification, however, for the purpose of providing an emitter having good emissive characteristics and thermal stability when utilized in elevated temperature environments. Additionally, the selection of suitable/ superior (emitter) materials is a well-known practice/ technique in the x-ray tube art.

#### ***Response to Arguments***

18. Applicant's arguments filed 3/29/02 have been fully considered but they are not persuasive. In particular, DeCou, Jr. et al. disclose an x-ray device comprising a vacuum enclosure containing an integral cathode, a power source and target anode. As indicated, DeCou Jr. et al., do not explicitly disclose the incorporation of an emitter having a predetermined geometrical shape configured to cause at least some of the discharged electrons to converge at a focal spot, or to be directed to the target surface of the target anode and to converge at a focal spot.

19. In order to compensate for this deficiency, Miriam is provided (U.S. Patent 3,558,967). This reference teaches the construction of an emitter (i.e. concavo-convex) configured to cause the discharged electrons to converge to a focal spot. The reference teaches that such construction

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shapes beam emissions to impinge on a concentrated area, thereby reducing energetic loss due to erratic electron propagation and to utilize the full power of thermionic emissions. A practitioner in the radiation art would recognize the advantage of this reference as it illustrates the benefit of emitter construction on beam propagation and shaping.

20. The formulation of the Office Action is based on the search for the teachings/motivation for the incorporation of a shaped emitter within an x-ray device. The aforementioned references, in addition to art related, conventional understanding is applied to support the notion of obviousness.

### *Conclusion*

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (703) 306-0473. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305 3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Courtney Thomas

June 14, 2002

  
ROBERT H. KIM  
SUPERVISORY PATENT EXAMINER  
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